



# APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:  
**AMMM000001U**  
Revision No:  
**2**

This is to certify:

That

**Breitenfeld Edelstahl AG**

**Breitenfeldstr. 22, 8662 St. Barbara-Mitterdorf, ST, Austria**

is an approved manufacturer of  
**Steelmaking**

in accordance with

**DNV-OS-E302 – Offshore mooring chain, Edition July 2018 (Amended August 2021)**  
**DNV class programme CP-0237 – Manufacture of offshore mooring chain and accessories**

and the following particulars:

<b>Product</b>	<b>Ingots for chain cables</b>
<b>Grades</b>	<b>R3S, R4, R5</b>
<b>Steelmaking</b>	<b>Electric arc furnace, Vacuum degassed, Ingot casting</b>
<b>Deoxidation</b>	<b>Killed</b>
<b>Fine grain elements</b>	<b>See page 2</b>
<b>Remarks</b>	<b>See particulars of the approval</b>

Manufacturer approved by this certificate is accepted to deliver according to DNV GL, DNV and GL rules. Materials to be applied to DNV classed object shall fulfill the material requirements in the applicable DNV class rules.

Issued at **Høvik** on **2022-03-31**

for **DNV**

This Certificate is valid until **2025-03-03**.

DNV local station: **Augsburg**

Approval Engineer: **Dechun Lou**

**Sondre Løken**  
**Head of Section**

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: AM 311

Revision: 2021-03

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**Particulars of the approval**

Ingots for chain cables		
Grade <sup>1)</sup>	Steelmaking <sup>2)</sup>	Fine grain elements
R3S	EAF, VD, IC	Al+V
R3S, R4, R5	EAF, VD, IC	Al

Remarks:

<sup>1)</sup> Specification for chemical composition according to table S1.

<sup>2)</sup> EAF: Electric Arc Furnace; VD: Vacuum degassing; IC: Ingot Casting.

Table S1 - Specification for chemical composition <sup>1)</sup> - Ingots for chain cables													
Grade		C	Mn	Si	P	S	Cr	Ni	Mo	Cu	Al	V	N
R3S	Min.	.10	.30	-	-	-	2.00	-	.90	-	.020	.030	-
	Max.	.20	.90	.50	.025	.015	2.50	.50	1.20	.35	.025	.050	.010
R3S	Min.	.30	.50	-	-	-	1.30	1.30	.15	-	.020	.020	.004
	Max.	.38	.80	.40	.010	.005	1.70	1.70	.30	.20	.035	.030	.010
R3S & R4	Min.	.30	.50	-	-	-	1.30	1.30	.20	-	.020	-	.004
	Max.	.38	.80	.40	.015	.010	1.70	1.70	.30	.25	.035	.030	.015
R5	Min.	.26	.30	-	-	-	1.80	1.80	.30	-	.020	.020	.004
	Max.	.34	.60	.40	.010	.005	2.20	2.20	.50	.20	.035	.030	.010

Remarks:

<sup>1)</sup> The content of Sn, Sb, As and B may be required. In such cases, the maximum content shall be 0.025 % for Sn, 0.0025 % for Sb, 0.010% As and 0.0005% for B.